

AMENDED CLAIMS

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[received by the International Bureau on 16 December 2003 (16.12.03);
new claims 41-52 added; remaining claims unchanged; (3 pages)]

35. The apparatus according to Claim 34, wherein the tracking unit (125) includes a tracking error correction unit for correcting tracking errors, the error correction unit comprising:

a position modulator (332) for modulating a position of the reading spot,
5 an error determination unit (333) for receiving a data signal having an amplitude which varies according to respective offsets from the track in radial and axial directions, and is responsive to the data signal to determine a direction of a respective offset from the track in radial and axial directions, which offsets may be fed to the optical unit to correct radial and axial position errors of the reading
10 spot.

36. The device according to Claim 35, wherein the reading spot is a volume of intersection of at least two light sources focused on the track.

37. The device according to Claim 35, wherein the position modulator is adapted to modulate a position of the reading spot with a cyclic function.

15 38. The device according to Claim 37, wherein the cyclic function is substantially sinusoidal.

39. The device according to any one of Claims 35 to 38, wherein the error determination unit includes:

a multiplier (340) for multiplying the data signal by a cyclic modulation
20 signal to form a modulated data signal, and
a low pass filter (341) for low pass filtering the modulated data signal.

40. The device according to Claim 39, wherein the low pass filter is a window integrator (341).

41. A method for correcting tracking errors in an optical storage medium
25 having multiple tracks arranged in different layers of the optical storage medium, the method comprising:

- (a) directing a reading spot that is nominally focused on to a track in the optical storage medium,
- (b) continually moving the reading spot in axial and radial directions,
- (c) receiving a signal having an amplitude which varies according to
5 respective offsets from the track in radial and axial directions,
- (d) using the received signal to determine a direction of a respective offset
 from the track in radial and axial directions, and
- (e) adjusting a location of the reading spot accordingly.

42. The method according to Claim 41, wherein step (a) includes directing at
10 least two light sources whose volume of intersection constitutes the reading spot.

43. The method according to Claim 41 or 42, wherein step (b) includes
modulating a position of the reading spot with a cyclic function.

44. The method according to Claim 43, wherein the cyclic function is
substantially sinusoidal.

15 45. The method according to any one of Claims 41 to 44, wherein step (c)
includes:

- i) reading a data signal with the reading spot,
- ii) multiplying the data signal by a cyclic modulation signal to form
a modulated data signal, and
- 20 iii) low pass filtering the modulated data signal.

46. The method according to Claim 45, wherein step (iii) includes window
integrating the modulated data signal.

47. An error correction device for correcting tracking errors in an optical
storage medium having multiple tracks arranged in different layers of the optical
25 storage medium that are read by a focused reading spot directed by an optical

head to a track in the optical storage medium, the error correction device comprising:

a position modulator for modulating a position of the reading spot,

an error unit for receiving a data signal having an amplitude which varies
5 according to respective offsets from the track in radial and axial directions, and is
responsive to the data signal to determine a direction of a respective offset from
the track in radial and axial directions, which offsets may be fed to the optical
head to correct radial and axial position errors of the reading spot.

48. The device according to Claim 47, wherein the reading spot is a volume of
10 intersection of at least two light sources focused on the track.

49. The device according to Claim 47 or 48, wherein the position modulator
modulates a position of the reading spot with a cyclic function.

50. The device according to Claim 49, wherein the cyclic function is
substantially sinusoidal.

15 51. The device according to any one of Claims 47 to 50, wherein the error unit
includes:

a multiplier for multiplying the data signal by a cyclic modulation signal to
form a modulated data signal, and

a low pass filter for low pass filtering the modulated data signal.

20 52. The device according to Claim 51, wherein the low pass filter is a window
integrator.